

ĐẠI HỌC QUỐC GIA TP. HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC CÔNG NGHỆ THÔNG TIN



UIT
TRƯỜNG ĐẠI HỌC
CÔNG NGHỆ THÔNG TIN

BÁO CÁO THỰC

HÀNH

MÔN CS106 – TRÍ TUỆ NHÂN TẠO

BT3 - Solving Knapsack Problems Using Google OR Tools

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[illegible]

Người nhận xét

CS106.021

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Quá trình thực hiện

- Đặt mốc chi phí là tối đa 120 giây cho mỗi lần chạy.
- Trong mỗi nhóm testcase, chọn ngẫu nhiên 1 testcase ứng với mỗi kích thước.

Kết quả

00.Uncorrelated

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\00Uncorrelated\n00050\R01000\s081.kp	50	13335	19473	13322	0
testcase\kplib-master\00Uncorrelated\n00100\R01000\s014.kp	100	26464	37248	26450	0
testcase\kplib-master\00Uncorrelated\n00200\R01000\s003.kp	200	49551	81680	49545	0
testcase\kplib-master\00Uncorrelated\n00500\R01000\s094.kp	500	123596	209767	123594	0
testcase\kplib-master\00Uncorrelated\n01000\R01000\s035.kp	1000	246819	398394	246812	0.01718
testcase\kplib-master\00Uncorrelated\n02000\R01000\s031.kp	2000	496783	822269	496780	0.015942
testcase\kplib-master\00Uncorrelated\n05000\R01000\s028.kp	5000	1233887	2034212	1233885	0.067444
testcase\kplib-master\00Uncorrelated\n10000\R01000\s017.kp	10000	2469230	4032422	2469230	0.31084

- Tìm ra lời giải chắc chắn tối ưu cho tất cả testcase

01. WeaklyCorrelated

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\01WeaklyCorrelated\n00050\R01000\s094.kp	50	11888	13175	11885	0
testcase\kplib-master\01WeaklyCorrelated\n00100\R01000\s013.kp	100	24322	26297	24319	0
testcase\kplib-	200	48881	54298	48881	0

master\01WeaklyCorrelated\n00200\R01000\s086.kp					
testcase\kplib-master\01WeaklyCorrelated\n00500\R01000\s094.kp	500	129518	142384	129516	0.015621
testcase\kplib-master\01WeaklyCorrelated\n01000\R01000\s069.kp	1000	245164	271373	245163	0.004618
testcase\kplib-master\01WeaklyCorrelated\n02000\R01000\s011.kp	2000	493039	545286	493039	0.009233
testcase\kplib-master\01WeaklyCorrelated\n05000\R01000\s075.kp	5000	1225116	1354119	1225116	0.092209
testcase\kplib-master\01WeaklyCorrelated\n10000\R01000\s054.kp	10000	2485622	2747406	2485622	0.299428

- Tìm ra lời giải chắc chắn tối ưu cho tất cả testcase

02. StronglyCorrelated

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\02StronglyCorrelated\n00050\R01000\s004.kp	50	12263	15763	12263	0
testcase\kplib-master\02StronglyCorrelated\n00100\R01000\s003.kp	100	26811	33711	26811	0.149914
testcase\kplib-master\02StronglyCorrelated\n00200\R01000\s011.kp	200	49817	63917	49817	120.0431
testcase\kplib-master\02StronglyCorrelated\n00500\R01000\s027.kp	500	128606	163206	128606	120.0339
testcase\kplib-master\02StronglyCorrelated\n01000\R01000\s029.kp	1000	242756	313119	242519	120.0459
testcase\kplib-master\02StronglyCorrelated\n02000\R01000\s064.kp	2000	494251	635151	494251	120.0243
testcase\kplib-master\02StronglyCorrelated\n05000\R01000\s077.kp	5000	1220893	1572869	1220469	120.0731
testcase\kplib-master\02StronglyCorrelated\n10000\R01000\s003.kp	10000	2480159	3184177	2479877	120.3268

- Chỉ tìm được lời giải chắc chắn tối ưu cho 2 testcase có kích thước 50 và 100

03. InverseStronglyCorrelated

File path	Problem size	Max weight	Total value	Total weight	Runtime
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testcase\kplib-master\03InverseStronglyCorrelated\n00050\R01000\s071.kp	50	12930	11430	12930	0.018454
testcase\kplib-master\03InverseStronglyCorrelated\n00100\R01000\s025.kp	100	28170	24970	28170	12.21254
testcase\kplib-master\03InverseStronglyCorrelated\n00200\R01000\s091.kp	200	63271	56671	63271	120.0443
testcase\kplib-master\03InverseStronglyCorrelated\n00500\R01000\s083.kp	500	155169	138642	155042	121.9788
testcase\kplib-master\03InverseStronglyCorrelated\n01000\R01000\s089.kp	1000	297453	265691	296991	120.5593
testcase\kplib-master\03InverseStronglyCorrelated\n02000\R01000\s069.kp	2000	593015	529919	592719	120.0464
testcase\kplib-master\03InverseStronglyCorrelated\n05000\R01000\s053.kp	5000	1492281	1333928	1492128	120.0723
testcase\kplib-master\03InverseStronglyCorrelated\n10000\R01000\s028.kp	10000	2966188	2652217	2966117	120.1523

- Chỉ tìm được lời giải chắc chắn tối ưu cho 2 testcase có kích thước 50 và 100

04. AlmostStronglyCorrelated

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\04AlmostStronglyCorrelated\n00050\R01000\s057.kp	50	12889	16292	12889	0
testcase\kplib-master\04AlmostStronglyCorrelated\n00100\R01000\s075.kp	100	25741	32654	25741	0.244647
testcase\kplib-master\04AlmostStronglyCorrelated\n00200\R01000\s035.kp	200	47486	61694	47484	0
testcase\kplib-master\04AlmostStronglyCorrelated\n00500\R01000\s000.kp	500	127278	162154	127278	120.0145
testcase\kplib-master\04AlmostStronglyCorrelated\n01000\R01000\s097.kp	1000	248678	319110	248678	120.028
testcase\kplib-master\04AlmostStronglyCorrelated\n02000\R01000\s020.kp	2000	490184	631421	489843	120.0349
testcase\kplib-master\04AlmostStronglyCorrelated\n05000\R01000\s089.kp	5000	1237047	1589318	1237047	6.847284
testcase\kplib-master\04AlmostStronglyCorrelated\n10000\R01000\s054.kp	10000	2485622	3188670	2485622	120.3157

- Tìm được lời giải chắc chắn tối ưu cho 4 testcase có kích thước 50; 100; 200; 5000

05. SubsetSum

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\05SubsetSum\n00050\R01000\s043.kp	50	12828	12828	12828	0.00368
testcase\kplib-master\05SubsetSum\n00100\R01000\s035.kp	100	24868	24868	24868	0
testcase\kplib-master\05SubsetSum\n00200\R01000\s019.kp	200	45641	45641	45641	0.000999
testcase\kplib-master\05SubsetSum\n00500\R01000\s027.kp	500	128606	128606	128606	0.001684
testcase\kplib-master\05SubsetSum\n01000\R01000\s097.kp	1000	248678	248678	248678	0.002572
testcase\kplib-master\05SubsetSum\n02000\R01000\s043.kp	2000	491101	491101	491101	0.012677
testcase\kplib-master\05SubsetSum\n05000\R01000\s013.kp	5000	1231397	1231397	1231397	0.045912
testcase\kplib-master\05SubsetSum\n10000\R01000\s011.kp	10000	2462668	2462668	2462668	0.145541

- Tìm ra lời giải chắc chắn tối ưu cho tất cả testcase

06. UncorrelatedWithSimilarWeight

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\06UncorrelatedWithSimilarWeights\n00050\R01000\s048.kp	50	247654 2	15837	240128 9	0.0045 87
testcase\kplib-master\06UncorrelatedWithSimilarWeights\n00100\R01000\s012.kp	100	495307 6	35206	490252 5	0.0478 31
testcase\kplib-master\06UncorrelatedWithSimilarWeights\n00200\R01000\s045.kp	200	990632 2	75694	990514 8	0
testcase\kplib-master\06UncorrelatedWithSimilarWeights\n00500\R01000\s044.kp	500	247649 70	18175 8	247127 33	120.03 44
testcase\kplib-master\06UncorrelatedWithSimilarWeights\n01000\R01000\s011.kp	1000	495290 80	37222 2	495235 72	0.3414 79

00\s077.kp					
testcase\kplib-master\06UncorrelatedWithSimilarWeights\n02000\R01000\s033.kp	2000	99059596	747261	99049394	120.0298
testcase\kplib-master\06UncorrelatedWithSimilarWeights\n05000\R01000\s005.kp	5000	2.48E+08	1861906	2.48E+08	120.0914
testcase\kplib-master\06UncorrelatedWithSimilarWeights\n10000\R01000\s093.kp	10000	4.95E+08	3733539	4.95E+08	120.2399

- Tìm được lời giải chắc chắn tối ưu cho 4 testcase có kích thước 50; 100; 200; 1000

07. SpannerUncorrelated

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\07SpannerUncorrelated\n00050\R01000\s081.kp	50	6076	6777	6075	0.009973
testcase\kplib-master\07SpannerUncorrelated\n00100\R01000\s014.kp	100	19750	14616	19720	120.0302
testcase\kplib-master\07SpannerUncorrelated\n00200\R01000\s003.kp	200	24625	22344	24624	120.0288
testcase\kplib-master\07SpannerUncorrelated\n00500\R01000\s094.kp	500	43763	72200	43748	126.8287
testcase\kplib-master\07SpannerUncorrelated\n01000\R01000\s035.kp	1000	199191	173615	199182	120.0665
testcase\kplib-master\07SpannerUncorrelated\n02000\R01000\s031.kp	2000	265680	42850	265670	122.0943
testcase\kplib-master\07SpannerUncorrelated\n05000\R01000\s028.kp	5000	482811	198036	482800	120.1127
testcase\kplib-master\07SpannerUncorrelated\n10000\R01000\s017.kp	10000	1545201	2414869	1545128	120.2763

- Chỉ tìm được lời giải chắc chắn tối ưu cho testcase có kích thước 50

08. SpannerWeaklyCorrelated

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-	50	6178	10988	6164	0.011968

master\08SpannerWeaklyCorrelated\n00050\R01000\s081.kp					
testcase\kplib-master\08SpannerWeaklyCorrelated\n00100\R01000\s014.kp	100	9824	37952	9819	120.0503
testcase\kplib-master\08SpannerWeaklyCorrelated\n00200\R01000\s003.kp	200	19807	40005	19775	119.7033
testcase\kplib-master\08SpannerWeaklyCorrelated\n00500\R01000\s094.kp	500	41977	88122	41969	120.021
testcase\kplib-master\08SpannerWeaklyCorrelated\n01000\R01000\s035.kp	1000	158826	360726	158820	120.023
testcase\kplib-master\08SpannerWeaklyCorrelated\n02000\R01000\s031.kp	2000	30321	406972	30319	120.0367
testcase\kplib-master\08SpannerWeaklyCorrelated\n05000\R01000\s028.kp	5000	143186	932456	143178	120.0619
testcase\kplib-master\08SpannerWeaklyCorrelated\n10000\R01000\s017.kp	10000	1617013	4171773	1617006	120.2716

- Tìm được lời giải chắc chắn tối ưu cho 2 testcase có kích thước 50 và 200

09. SpannerStronglyCorrelated

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\09SpannerStronglyCorrelated\n00050\R01000\s094.kp	50	4230	22222	4222	93.53636
testcase\kplib-master\09SpannerStronglyCorrelated\n00100\R01000\s013.kp	100	10370	40746	10346	116.3455
testcase\kplib-master\09SpannerStronglyCorrelated\n00200\R01000\s086.kp	200	18971	98654	18954	120.0616
testcase\kplib-master\09SpannerStronglyCorrelated\n00500\R01000\s094.kp	500	41953	232320	41920	120.0254
testcase\kplib-master\09SpannerStronglyCorrelated\n01000\R01000\s069.kp	1000	94391	483084	94384	120.0346
testcase\kplib-master\09SpannerStronglyCorrelated\n02000\R01000\s011.kp	2000	245896	833361	245861	120.0296
testcase\kplib-master\09SpannerStronglyCorrelated\n05000\R01000\s075.kp	5000	541956	1929455	541955	120.0514
testcase\kplib-master\09SpannerStronglyCorrelated\n10000\R01000\s054.kp	10000	1273941	5212314	1273914	120.2806

- Tìm được lời giải chắc chắn tối ưu cho 2 testcase có kích thước 50; 100

10. MultipleStronglyCorrelated

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\10MultipleStronglyCorrelated\n00050\R01000\s004.kp	50	12258	20450	12250	0
testcase\kplib-master\10MultipleStronglyCorrelated\n00100\R01000\s003.kp	100	26808	41805	26805	0
testcase\kplib-master\10MultipleStronglyCorrelated\n00200\R01000\s011.kp	200	49812	80908	49808	0.001248
testcase\kplib-master\10MultipleStronglyCorrelated\n00500\R01000\s027.kp	500	128604	205104	128604	120.3484
testcase\kplib-master\10MultipleStronglyCorrelated\n01000\R01000\s029.kp	1000	242754	398754	242754	120.0261
testcase\kplib-master\10MultipleStronglyCorrelated\n02000\R01000\s064.kp	2000	494250	802850	494250	120.0435
testcase\kplib-master\10MultipleStronglyCorrelated\n05000\R01000\s077.kp	5000	1220892	1994892	1220892	120.1189
testcase\kplib-master\10MultipleStronglyCorrelated\n10000\R01000\s003.kp	10000	2480154	4030439	2480139	120.4751

- Tìm được lời giải chắc chắn tối ưu cho 3 testcase có kích thước 50; 100; 200

11. ProfitCeiling

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\11ProfitCeiling\n00050\R01000\s071.kp	50	10454	10446	10453	0.004988
testcase\kplib-master\11ProfitCeiling\n00100\R01000\s025.kp	100	23220	23205	23220	0.018113
testcase\kplib-master\11ProfitCeiling\n00200\R01000\s091.kp	200	53370	53340	53370	3.943108
testcase\kplib-master\11ProfitCeiling\n00500\R01000\s083.kp	500	130417	130371	130415	120.1193
testcase\kplib-master\11ProfitCeiling\n01000\R01000\s089.kp	1000	247948	247854	247946	120.041
testcase\kplib-master\11ProfitCeiling\n02000\R01000\s069.kp	2000	494005	493821	494004	120.0301
testcase\kplib-master\11ProfitCeiling\n05000\R01000\s053.kp	5000	1244756	1244301	1244755	120.0555

testcase\kplib-master\11ProfitCeiling\n10000\R01000\s028.kp	10000	2471138	2470188	2471137	120.2981
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- Tìm được lời giải chắc chắn tối ưu cho 3 testcase có kích thước 50; 100; 200

12. Circle

File path	Problem size	Max weight	Total value	Total weight	Runtime
testcase\kplib-master\12Circle\n00050\R01000\s057.kp	50	12889	271584	12889	0.001996
testcase\kplib-master\12Circle\n00100\R01000\s075.kp	100	25741	542386	25741	120.242
testcase\kplib-master\12Circle\n00200\R01000\s035.kp	200	47486	1000572	47486	0.008444
testcase\kplib-master\12Circle\n00500\R01000\s000.kp	500	127278	2681868	127278	120.2467
testcase\kplib-master\12Circle\n01000\R01000\s097.kp	1000	248678	5239876	248678	120.0385
testcase\kplib-master\12Circle\n02000\R01000\s020.kp	2000	490184	10328628	490184	120.0165
testcase\kplib-master\12Circle\n05000\R01000\s089.kp	5000	1237047	26065737	1237047	120.0419
testcase\kplib-master\12Circle\n10000\R01000\s054.kp	10000	2485622	52374379	2485622	120.173

- Tìm được lời giải chắc chắn tối ưu cho 2 testcase có kích thước 50; 200

Kết luận

- Các nhóm testcase 00Uncorrelated, 01WeaklyCorrelated, 05SubsetSum là dễ nhất (tìm được lời giải chắc chắn chắc chắn tối ưu cho tất cả testcase).
- Nhóm 07SpannerUncorrelated là khó nhất (chỉ tìm được lời giải tối ưu cho 1 testcase).